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MENTAL SYMPTOMS

OF

FATIGUE

By EDWARD COWLES, M.D.

Medical Superintendent of the McLean Hospital

SOMERVILLE, MASS.

Reprinted from the Transactions of the New York State Medical Association

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THE MENTAL SYMPTOMS OF FATIGUE.[1]

The subject of mental symptoms carries with it the suggestion of something vague and difficult of apprehension. The study of mental disorders is forbidding to the general physician who feels that he has neither time nor patience for it. The present purpose is to contribute something to a better understanding and an easier appreciation of the mental symptoms of fatigue, which will be considered under the following heads: (1) the nature of mental symptoms; (2) the physical conditions of fatigue; (3) some elementary facts of the nervous and mental mechanism; and (4) the alterations of mental functions that are significant as symptoms.

1. THE NATURE OF MENTAL SYMPTOMS.

It has been the fashion to regard this branch of neurology as being slow in its progress, having no coherent principles, resting upon an indeterminate basis, and as being unscientific in its classification and therapeutics. Krafft-Ebing admits that the anatomy of the nervous system has so far been incomplete and unsatisfactory in not enabling us to reason from structure to function, as has been done in the relatively simple structure of the vegetative organs; and that pathology has been disappointing in failing to explain the most marked disturbances of function. But he points to the fact that psychiatry is one of the youngest of our special sciences. He says it seems almost exclusively dependent

[1] Read before the New York State Medical Association, November 16, 1892.

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on itself, and is limited to the direct observation of morbid mental phenomena; also that it is from the empirical valuation of these phenomena that we are obliged to draw conclusions as to the kind and degree of the functional disturbance in the organ of mind. His conclusion is that great progress has been made in the raising of psychiatry to the rank of a natural science with methods of empirical research. Its direct advancement can be accomplished only by tireless observation and report of clinical phenomena, and thus fixing the facts of the mental life. While mental disease is always brain disease, the course of the processes in mental disorders is discovered through observation, as in any other disease.

The hope of gaining a clearer appreciation of mental symptoms lies in the fact that we may observe so much more directly the manifestations of mind, and consequently of nervous function, than we can those of any other function of the nervous system. We may study, by the aid of anatomy, physiology, pathology, and physics, an involuntary mechanism like the heart; or the action of the muscular system as a voluntary mechanism. In the action of the peripheral apparatus we note the expression of the setting free of central nervous energy, and can trace the conducting path of the motive energy back to motor centres. But we can get no further than to speak of "innervation" and "inhibition" with entire ignorance of the way in which nervous substance is stimulated, and augments or controls that which stimulates it into activity. We are conscious that the mode of expression of the active mind through the peripheral instruments is indirect.

All this is true also of the complex organ of speech, when examined as an organ, and as one of the minor mechanisms of whose anatomy and pathology we may make the most scientific study, as we need to do for a correct interpretation of any change from normal action. But through this organ we hear in the articulate sounds with varied tone, pitch, and inflection, and in the words

which this instrument produces, the direct expression of a function by which brain cells are able to convey to our understanding the largeness and fineness of meaning that is comprehended in the "infinite variety" of the human mind. This takes us into a field of phenomena that our kindred sciences fail to reach. Instead of lamenting that they do not aid us, it is perhaps more true to say that we do not need their aid in the interpretation of these manifestations, which, by a superior mode of expression, convey finer variations of meaning, and make revelations of earlier and slighter departures from normal action than we can get from any other function of the human organism. Moreover, it is given us to make these discriminations by the natural law of mind, without any need of laborious study and interpretation of the working of an intervening instrument. We hear the expression of thought and feeling in sounds that we come to know, and we need not stop to note the mechanism of their utterance. From the moment when we are thrust into this noisy world, the articulate sounds of the human voice begin to be familiar to us. Every man makes his way in the world largely by his success in measuring the minds of his fellow-men. We have, by nature, a most intimate common knowledge of variations in mental function; of no science have we a more practical every-day knowledge than of psychology. It is true that we have to discover a way to reduce the data of this knowledge to orderly form, and to recognise the import of commonly observed mental manifestations by observing their correspondence with recognised bodily conditions. This must constitute a true science of the health and disease of a function which has its own peculiar character and physiological laws.

The nature of mental symptoms, or manifestations of departures from normal functions, being thus understood, we should approach their study with minds free from prejudice, prepared to observe and fix the facts of each kind of manifestation and array them in the order

of their occurrence and relations with each other. The question now comes, can we set up a plain and intelligible conception of the normal mental mechanism that will serve as our standard in which to note and localise, as it were, the departures from normal action? We must begin in an elementary way, and deal first with the slighter variations from conditions of health in the mechanism, and its fullness of power to do what it can do. In the brief time allotted here, the attempt will be made to do little more than to point out a method of observation and study on the basis of some of the primary facts of the mental and nervous mechanism.

2. THE PHYSICAL CONDITIONS OF FATIGUE.

The proposition may be laid down to start with, as a working formula, that the organ of the mind is an apparatus for the storage and discharge of nervous energy, and that all mental symptoms indicate a failure of the mental elements to functionate with normal co-ordination, because of modification of the power to set free nervous energy, due to lack of the discharging force, or the obstruction of it, or to lessened power of control; or as due to excess of stimulation and discharge, which means also relative weakness of inhibitory control. All of these conditions of nervous action may exist together, or side by side, and often do, not only in the most manifest of mental diseases, but in the lesser degree of nervous fatigue. In fact the key to the understanding of these graver conditions seems to be in the appreciation of the slighter degree of nervous exhaustion always to be observed in normal fatigue. The condition of the central organ may be directly observed through the mental symptoms which quickly reflect the variations in nervous force and activity. The correct understanding of these symptoms is essential to the best treatment of nervous exhaustion in all its forms. And this is the soil in which the more serious nervous diseases take root and grow.

The bodily conditions of fatigue should first be considered as far as we can know them, and may be studied in their two forms of degrees: (1) *normal fatigue*, or th condition of wholesome tire from daily physiological use; and (2) *pathological fatigue*, or the condition of persistent "impoverishment of nervous tissue in excess of repair," according to Beard, which constitutes nervous exhaustion or neurasthenia. The mental symptoms are to be studied in their close and direct correspondence with these conditions of fatigue.

The effects of fatigue are produced by sufficiently continued exercise in the physiological use of any function, muscular or nervous. The sense of fatigue is complex, and may have a central or peripheral source, or both together. In muscular tissue the condition of fatigue depends upon the physiological fact that muscular contraction is in some way or other the result of a chemical change, whereby the latent energy is set free and expended in the mechanical work, with also the setting free of heat. The resultant chemical products are toxic, and obstructive of muscular function unless they are duly washed away in the blood current; and time must be given in rest and sleep for this process, as well as for nutrition and repair. These toxic products being variously irritant or benumbing, doubtless thus affect the sensory apparatus through which fatigue is felt. It is evident from this that the condition of muscular fatigue has always a dual character—there is direct expenditure of energy, requiring repair, and a toxic element that may be obstructive of function, both that of discharging energy and of taking up nutrition.

In nervous substance, the nature of nerve force being unknown, the effects of the passage of a nervous impulse along nerve-fibres are not demonstrable as attended by chemical changes, or loss of normal irritability as a manifestation of fatigue.[1] But in the central nervous organs it is found that their function is dependent on an

[1] Bowditch, Jour. of Phys., Vol. 6, p. 133.

adequate supply of oxygen, and this implies that "in nervous, as in muscular substance, a metabolism, mainly of an oxidative character, is the real cause of the development of energy."[1] In fact we do not doubt that toxic waste products attend upon central nervous activity, and this accords with the biological theory that all function is due to chemical changes taking place within the organism, and that the functional activity of a specialised tissue depends primarily upon the changes in its individual cells. The dual character of all conditions of primary fatigue is evident, as is also the importance of recognising the effects of the self-produced poisonous substances that regularly result from the chemical changes in tissue metabolism within the body, as we are taught by the brilliant revelations of modern chemical physiology and pathology.

Normal fatigue from the discharge of tissue energy is therefore shown to be inseparably accompanied by toxic products that contribute to the effects of fatigue. *Pathological fatigue* represents a further development and persistence of this condition in the organism. Stimulation too soon repeated, without giving time for rest and repair, finds nerve-cells in fatigued areas having less power to act because of inanition from deficient rest and nourishment; they are also hindered in action by the incomplete removal of the toxic products of previous action. Then assimilation is further hindered, first, by the lessened nutritive quality of the blood from the presence of non-eliminated toxic materials; and second, by the probable toxic weakening of the cells' power to assimilate the nutrition that is furnished to them. The development of a manifestly morbid condition may be very slow and insidious, or more rapid, according as the balance of the processes of constructive and regressive metabolism are more or less on the side of impoverishment, exhaustion, and weakness. From the gradually failing elimination, the local inanition may become more

[1] Foster, Physiology, 5th Eng. Ed., 1890, pp. 914–918.

general, and the first results are an increased excitability from weakened resistance and inhibition, with a quick exhaustion of the nervous system under exercise. These are the constant characteristics of neurasthenia. Thus, as Kowalewsky [1] says, "a locally limited over-strain of a certain part of the nervous system may lead to general exhaustion and neurasthenia." Hence neurasthenia has been defined by Ziemssen [2] as "a functional weakness of the nervous system, varying from the slightest degrees in simple localities to entire loss of strength in the whole nervous system." Arndt [3] states the characteristics of neurasthenia to be "increased excitability with a tendency to rapid fatigue, especially of the muscular system." He notes particularly, also, the cerebral irritability, and hyperaesthesia of the cranial nerves, especially those of special senses.

The remarkable experiments of Hodge[4] are most suggestive as demonstrating the physiological shrinkage and recovery of cell contents in spinal ganglion cells; it is shown that upon stimulation and upon normal exercise, the histological changes of breaking down and building up of cell contents are accompaniments of the physiological discharge and re-storage of energy, and as being normally attendant upon fatigue followed by rest.

The conditions of the organism in normal and pathological fatigue being thus understood, we have a basis for the study of the relation thereto of the mental symptoms of fatigue. It is agreed by all observers that the symptoms of nervous exhaustion are mainly subjective. The objective symptoms need not be dwelt upon here; the commonly noted manifestations of increased excitability, irritability, and restlessness, are readily recognised as representing the internal hyperaesthesia so significant of the "irritable weakness" of nervous exhaustion. The

[1] Centralblatt, f. Nervenheilkunde, October, 1890.
[2] Neurasthenia, Wood's Monographs, Vol. 1, 1889, p. 534.
[3] Art., Neurasthenia, Tuke's Dict. Psych., Med., 1892, Vol. 2, p. 843.
[4] *Amer. Jour. of Psychol.*, May, 1888; May, 1889; and February, 1891. Also, *Jour. of Morphology*, November, 1892.

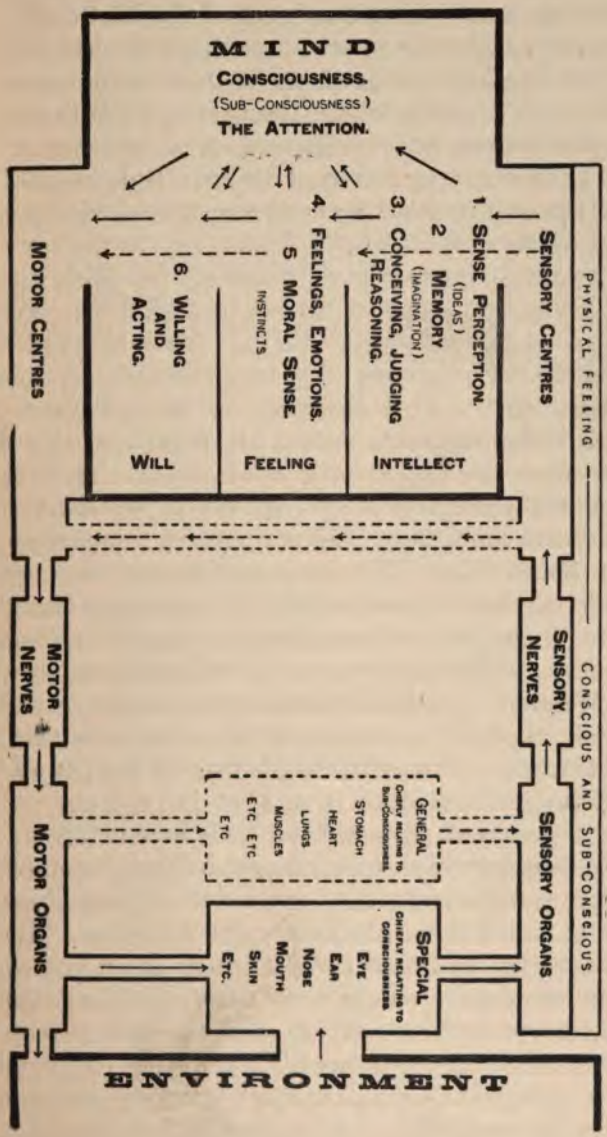
purpose now is to show the significance of a few easily, and in fact commonly, recognised subjective or mental symptoms, which stand as distinctive signs of fatigue. They furnish a ready index of the fatigue and auto-intoxication of nerve and muscle tissues as a guide for diagnosis, prophylaxis, and treatment; and the general symptoms of nervous exhaustion can be understood better and earlier by the proper interpretation of the mental symptoms.

3. SOME ELEMENTARY FACTS OF THE NERVOUS AND MENTAL MECHANISM.

In order to make clear the changes, that we call symptoms, in the mental manifestations, it is necessary to note some elementary facts in the relations between the functions of the mind and body. While they are very complex in their detail, there are still certain broad generalisations that we could readily grasp but for the difficulty of keeping a number of the elements alike prominent in our minds at the same time, while studying their inter-play. This may be aided, with some exercise of the imagination, by the tabulated diagram here presented. It is designed to represent the *nervous and mental mechanism*, and to show some of the relations of the inner activities that we call mental, to the body in general, and to the environment.

Let us suppose that we can look into the region of conscious mind as into an enclosed place, and a section being made of it we can see noted thereon, as in the "field of consciousness," the modes of mental action as they are designated by common agreement. At the other end of the diagram are noted the organs of special sense through which stimuli from the environment start impulses that are conducted along sensory tracts, and produce physical sensations in the sensory centres in the entrance to the field of consciousness. When these sensations are intense enough to pass over "the threshold" of the field of

NERVOUS AND MENTAL MECHANISM



consciousness, there is a conscious mental perception of such sensations, as of sight, hearing, and the like. This is the initial event of the process by which we mentally see, perceive, and know, something in the environment; there is, through sensory action, the presentation in our field of consciousness, and the *perception* of what we call the image or idea of the external thing. But we may immediately remember that we have seen the same object before, and we become conscious of an action of *memory*, by which we retain impressions previously received, and can recall them by the law of association of ideas. We image them again, or imagine them. Thus a complex mode of mental action arises; there is *consciousness*, then conscious *perception* of a sensation, as from the sense of sight, and the *memory*, acting all together. Hard upon this comes the higher process of ideation or intellection, the comparing process, by which we *conceive* abstract notions of things, *judge* them by comparison, and *reason* about them. All these may be included also in the mode of consciousness along with perception and memory, and form parts of a complex process of knowing, or intellection, although we name them as separate actions. Whenever we talk with a man, we gauge and test minutely all these operations of his mind with great practical accuracy. We estimate his mental quality and power; we judge the man by what his mind can do.

One of the points of present interest is now before us; as the antecedent fact in the mental process just described, we must premise the state or existence of consciousness, without which there can be no mental action. We may say that there is latent consciousness in an unborn infant, that soon after enters upon conscious life; then consciousness springs into action, and the first perception is likely to be of sensations from the sense of touch. But active consciousness is always attending to some presentation in its field, to the more or less complete exclusion of other presentations. While the multitude of sensations are thronging into the sensorium through

all the organs of special sense, the *attention*, being fixed upon some intensified perception, excludes all but this intensified one. The same is true of a presentation of memory, or of a process of reasoning; or all these may be involved in a complex object of attention. Whenever, by the action of what we call the attention, we hold in mind a perception, a memory, or the data of a process of reasoning, we are exercising the memory also in the very act of retaining all these elements of the mental process. On the other hand we know that by the attention we can control the memory, by controlling and changing the flow of ideas it recalls; and all this goes to show the inseparable working together of these processes.

The *attention* is a mental element of the greatest interest, and is commonly regarded as meaning a "concentration of consciousness." According to Sully[1] it may be defined as the active intensification of consciousness in particular directions. Whatever, at any time, "occupies the mind," is for the moment the supreme object of attention. The attention is one with active consciousness, and is often described as accompanying every other mental action.

It is a common experience, in revery and in dreams, that a spontaneous flow of ideas is continually passing through the mind; one item follows another in the train of associated ideas through the working of memory and imagination by the laws of habit and association, without direction or control. The attention is then said to be acting in one of its two forms, and this form is *spontaneous attention*. It is also called *reflex attention*, as it acts by being attracted to the idea or object in the mind that most interests it, or keeps it on the alert, or stimulates it. The idea may be intensified in interest by pleasurable or painful *feeling*, by a desire or a fear. The act itself of attention to such an object of thought, increases the intensification of it, and tends to keep

[1] Art., Attention. Tuke's Dict. Psych. Med., Vol. 1, p. 106.

ideas of kindred nature in the mind; the mind dwells upon them, is absorbed in them.

Voluntary attention is the other form of this mental function; and this is at the very centre of interest in this inquiry. It is spontaneous attention with the added power of direction and control; the attention is thus inseparably associated with the will, volition, or controlling power. The essential fact is that in voluntary attention lies the mental activity of inhibition; it is inhibition working through attention. According to Foster, just as physiological inhibition plays its part in the lower mechanisms of the body, so is it important in the whole work of the central nervous system. Also, just as all voluntary muscular actions are under the control of an attending will, so is the directing and concentrating of the attention upon a chosen thought an act of volition. A man controls his own mind by willing his attention, as it were, to be fixed upon some one item or object, in the train of presented ideas, to the exclusion of others. He thinks about what he chooses to think about, and inhibits mind wandering. He may make the most worthy object interesting; this is intensified by holding in mental view its worthiness, and thus the attractions of less worthy interests and emotions are resisted.

Sully says it is pre-eminently by acts of attention that all the elaborative work of thought is effected, and that the attention is the great conditioning factor in our intellectual life; all great intellectual achievement involves energy of will acting as voluntary attention. The student attains to this power by training and education of his higher mental control; the man who chooses the path of wisdom and rectitude exercises and strengthens his power of voluntary attention by the practice of self-control in inhibiting the impulses of his passions. Thus it is that voluntary attention is in close relation with the highest as well as the latest developed acquirements of the mind, in its power to use the force of nervous energy to the best effect. It is well known that the latest

acquirements are soonest impaired with the abatement of normal energy.

Every exercise of the will in attention is accompanied by the expenditure of energy, and by the "sense of effort" that occurs, particularly when the attention works against some resisting motive, interest or feeling. This directing and inhibitory control is at its best in the equilibrium of health of mind and body, and therefore it is a most important means of estimating mental health and vigor; mental disorder is commonly attended with disturbances of the normal process of attention, as will directly appear in the discussion of mental symptoms. This constitutes one of the points of great diagnostic value.

We have, so far, concerned ourselves in this discussion quite exclusively with the processes of knowing or intellection. But we are always conscious of another order of mental phenomena, the *feelings*, and they are of pleasure or of pain, or they may be in varying degrees agreeable or disagreeable. From the lower forms of bodily pleasure and pain, upward in the scale to those aroused by the perceptions of color and music, the feelings are said to be "corporeal." But the purely mental feeling that always attends upon pleasurable or painful ideas, is inseparable from them. Without ideas there can be no such feeling; and according to its intensity, a feeling of pleasure or pain intensifies the idea it accompanies, and makes it prominent in consciousness, tending to attract more strongly, and to hold, the attention. Thus, as has already been shown, there may be an antagonism between worthy and unworthy ideas and feelings, or in the moral sense of right and wrong, with need of the inhibitory power of voluntary attention to choose, control, and guide conduct. This brings out the opposing factors in the operation of will, attention, ideas, and feelings. The feelings excited by ideas prompt to action, which may be inhibited or augmented by an opposing or consenting will.

Referring now to the diagram, the relations of these activities are seen to be noted in their natural order. Feeling follows upon intellection, and all the included mental activities are operating in the field of consciousness. The outcome of this interplay is in the union of *willing* with *acting* at the point where the resultant of the mental forces appears to act upon the motor centres, or stimulate in them the impulses that end in the setting free of muscular motion. Thus the picture of the "nervous circle" is now complete, and shows the working of the nervous and mental mechanism under the stimulation of sensations through the special senses. Then consciousness, through the attention (these two being general states, or modes of mental action), knows, or "sees" in the very mind's eye, the special modes of action which we call sense-perception, memory, reasoning, feeling, and the willing of motor impulses which end in muscular motion. This completes the "circle."

The sensations from the special senses are those of which we are most conscious; they are of high intensity, but we little realise that they are small in volume compared with the great inflow of organic sensations of which, in normal conditions, we are not conscious. These organic sensations, that, according to Ribot, give us the *sense of body*, or of *personality*, are of low intensity but vast in volume; proceeding from every minute part of the tissues and organs of the body, their inflow, along sensory tracts, enters the sensorium beneath the "threshold of consciousness" into the region of subconsciousness. Their origin is shown in the sources noted in the fainter letters in the diagram, and their course by the dotted lines. The muscular sense, which is complex in its origin, includes feelings that afford an example of the more pronounced of these organic sensations. Thus, we get the sense of weight and posture. Again there are those not felt in normal conditions, but, like hunger and thirst, which are general in their origin, may become intensified so that at times there is

consciousness of them. There are still others, as in the morbid conditions of hyperaesthesia, and paraesthesia, that appear as pain or a general feeling of misery; they are vague in character, and their sources often can not be determined.

These organic sensations, and their alterations, are of such a nature that they afford another point in the nervous and mental mechanism of great diagnostic value. In normal states, when all is well with the organism in the equilibrium of health, they constitute the sense of well-being. Here again we have an important means of measuring any falling off of nervous vigor; from the slighter alterations of bodily feelings in fatigue to those that create a persistent sense of ill-being, these changes cause variations in the "emotional tone" that are the most sensitive indices of the degree of fatigue and exhaustion, both normal and pathological. The emotional tone is thus seen to be affected in two ways. There may be, in health, all degrees of pleasurable or painful mental feeling, between the extremes of exaltation and depression, according to what one has to think about; in this case a lowered emotional tone from grief or care may be a passing event, or if prolonged, may have a directly debilitating effect upon the organism through the motor tract of the nervous system. The stimulant and depressant effects of the natural emotions upon the circulatory system and upon bodily health in general, are well enough known. On the other hand, a persistent state of morbid depression of feeling may be no more than the mental concomitant of bodily ill-being, however it may have been induced. There may be three events in the train: first, undue care, real trouble, and anxiety or grief may initiate a general condition of ill-being, which, in turn, may be the cause of morbid depression as the third event. The first in this order may be entirely wanting, but the condition of ill-being, through impairment of health and nervous vigor, must exist from some cause before the strictly morbid mental symptoms can appear.

4. THE ALTERATIONS OF MENTAL FUNCTIONS THAT ARE SIGNIFICANT AS SYMPTOMS.

It now remains to describe the special alterations in some of these prominent factors of the mental mechanism, and their significance in conditions of normal and pathological fatigue. In *normal fatigue* it is to be kept in mind, that the dual physical condition is one of the expenditure of nervous energy in work to the immediate fatigue of nerve cells, and the accumulation, locally and in the circulatory system, of toxic waste products; and that the processes of nutrition and elimination require time and rest. The mental concomitants of this condition are: a diminished sense of *well-being*, or a feeling of fatigue, sometimes amounting to a sense of *ill-being*, which includes in its complex causation the influence of the toxic elements. The emotional tone is lowered, and there is less vivacity of feeling. There is also lessened mental activity in general. Voluntary attention is fatigued; that is, the mental inhibition is lessened, with diminished control over the attention, and one is conscious of an extra sense of effort in mental work. There is "mind wandering." The logical processes work more slowly and with less effect in making comparisons and judgments, and in reasoning to conclusions; the tired attention holds on with effort to one member of a proposition, while another slips away. There is a consciousness of mental inadequacy and difficulty in keeping awake. This is the common experience of evening tire. Restoration follows upon a due amount of rest, sleep and nutrition, and the somnolence disappears when the acid waste products, etc., in the circulation are removed.

The condition of *pathological fatigue* is induced when the process of restoration is continuously incomplete. Then we have to conceive of deficient nutrition and an irritating intoxication as both contributing to the "irritable weakness," which is a manifestation of the characteristic hyperaesthesia. We may now note the

significant alterations of the feelings, the irritability of temper, the weakening of the power of voluntary attention, and the effects of these alterations. The patient may complain of painful or miserable bodily sensations, hyperaesthesia and restlessness; and often of paraesthesia in various forms. The symptoms may be analysed and classified according to the order of their appearance, and the functions affected.

The *first order* of mental symptoms of pathological fatigue, in the importance and earliness of their appearance, may now be noted. These most obvious mental signs are the characteristic *depression of feeling, a lowering of the emotional tone, and a sense of ill-being.*

The symptoms quickly reflect debilitated bodily conditions that are the sources of the "miserable feelings." These subjective indications are often the only ones of the existing exhaustion in its complex character. Again, they are corroborative of a suspicion of general neurasthenia when complaint is made of some local functional disorder; in other words, local disorder is often shown to be simply an expression of general neurasthenia, of which the only diagnostic evidence is in the mental symptoms.

The *second order* of mental symptoms, in time of appearance, is usually the persistent *decrease of the power of voluntary attention* (*reflex attention*), *and sometimes of memory; there is also the sense of inadequacy of effort.*

These symptoms refer to the attention, which acts in a more spontaneous and reflex manner as its control is weakened; the memory is weakened in its power of retaining and recalling ideas. This lessening of inhibitory power, and mental activity in general, shows the abatement of cerebral energy. It does not always appear to the observer, for the reason that the patient may draw upon the reserved nervous energy, and put forth more effort in the act of controlling his attention, and succeed in doing it. But he is both expending energy more rapidly in so doing, and is conscious of the need of

increased effort; he will usually readily confess it on being questioned. This consciousness finally amounts to the very characteristic sense of inadequacy. This symptom of weakened voluntary attention is also an early one, and is very diagnostic. The patient will often complain that he cannot keep his thoughts on his work or business, or has to read over again what he reads, and can not remember it. One patient said "I can not sense it;" and another, "I can not center my mind on what I try to do."

A *third order* of symptoms may now arise, and it is an interesting fact that they grow out of the other two orders, and are their logical consequence; these are *morbid introspection, retrospection, and apprehension* (*worry and hypochondria*).

These symptoms, when manifestly developed, mark a graver degree of fatigue. The emotional tone being lowered, the patient in a state of depression of feeling is prone to "look upon the dark side of things." Ideas are intensified that are accompanied by painful feelings, which are thus in harmony with the prevailing emotional tone. There being also a lessening of nervous energy in voluntary attention, it cannot inhibit the intensified painful ideas and feelings, and there is consequently *worry* about the present, past, and future. The vague fear arises of being unable to meet the requirements of the future. The increasing sense of present inability gives intensification to the characteristic sense of inadequacy noted by Beard as being so prominent.

There is one other set of symptoms to be mentioned as constituting a *fourth order*. While those previously noted are purely mental, these are partly so, but relate chiefly to alterations that cause peculiar bodily effects, and are often manifest to the observer. These symptoms are: *changed organic sensations, physical and mental irritability, and restlessness; diminished sensitiveness, dullness and languor.*

There is apparent irregularity in these changes of

bodily feelings and their manifestations—the intensifying of some and the lessening of others. Arndt[1] says: "It is clear that the increased hyperaesthesia, which a degenerating nerve at first presents, can not last long, and that soon decreased excitability, bluntness, paresis, or whatever we call fatigue or exhaustion, must take its place."

There is not alone hyperaesthesia, with the external signs of irritability and restlessness, but there is much diminished sensitiveness. Some cases are altogether of the latter character, and many present both conditions at the same time, in some particulars. It may be a question of the different effects of variations in the toxic waste products. While chemical physiology and pathology do not yet enable us to ascribe sensory and motor disorders definitely to the influence of poisons produced within the organism by its own activity, it cannot be doubted that both the conditions of nervous irritability and those of dullness, languor, and stupor, may be so caused. It is certain that such external manifestations may be caused as the direct expression of defective functional activity in cerebral centres that are the source of the nervous energy which innervates and controls both the somatic and mental mechanisms. The study of physical expression which Darwin raised to the dignity of a new science, shows that while there is certain voluntary control over it, still the manifestations in the muscular movements of expression, whether occurring in the face or the extremities, have a direct automatic dependence upon interior states of the central nervous system, which are thus externally reflected. The inflow of organic sensations to the senorium has its complement in the constant, regular and subconscious transmission of nerve force from central cells to the muscular periphery. This accords with Gowers' statement that every structure of the brain concerned with sensation proper is connected directly or indirectly with a part concerned

[1] Loc. cit.

with motion; and, in regard to the unstable condition of brain cells in disease, when the equilibrium between the discharge of energy and the inhibition of it is disordered, "the discharge may depend on the production of force within being increased in excess of the resistance, or on the resistance being duly lessened."

In the common forms of insanity are seen the most pronounced expressions of excessive or diminished central activity, and this applies alike to innervation and inhibition, whether mental or somatic. In the belief of the writer[1] it is possible to detect important variations in the several elements of mental activity in normal fatigue and nervous exhaustion. For example: the letting down of mental power in voluntary control, with the consequent lessened inhibition of verbal expression of grief and worry, or excitability and aggressiveness. Bancroft[2] has made an instructive application of the physiological principles of expression, to the study of facial expression of the emotions in insanity and of expression in posture, etc., as the results of habit in automatic muscular action. His work gives definite value to the clinical use of photog raphy in the physical expression of mental changes.

All such clinical studies of mental symptoms demonstrate the value of precise appreciation of the changes in the elementary mental activities. It is common to observe, in mania, either excessive, uninhibited, mental and motor activity, or the quite normal control of the latter, along with the gravest deficiency of mental inhibition. Again, there is excessive nerve-muscular activity, or tension in fixed attitudes, in the mental and motor expression of painful emotion in melancholia, and in consequence of lessened inhibitory will power; and still again, all expression may be abolished in the real mental stupor of melancholia and mania. This abolition may

[1] Pathological Fatigue or Neurasthenia; also the Shattuck lecture; 1891 Med. Com. Mass. Med. Soc.—*Amer. Jour. Insanity*, July and Oct., 1891.

[2] Automatic muscular movements among the insane, *Amer. Jour. of Psych.*, Feb., 1891.

also be due alone to the fact that, while perception and ideation are quite normal, the power to give expression to them is diminished or lost, either in the failure of the mental function of willing, or of excitability in the motor centres. A man at the McLean Hospital, who was apparently in profound stupor, afterwards said: "I wanted to answer you, but couldn't make my jaws go." A woman who would stand in a fixed position for hours with almost entire loss of muscular movement and expressionless face, could respond to kind words only by directing her eyes, and they would fill with tears. When she was well, the next year, she gratefully told what had been said and done to her. The apparent stupor is often mistaken for the real condition.

These discriminations of the mental processes being once established, they have the highest therapeutic value in their preventive application. Hence the thesis of this paper: the importance of an early appreciation of the mental symptoms of normal fatigue that tends to nervous exhaustion, for they are prodromic of its graver forms. Moreover, the recognition of the significance of changes in the motor and sensory manifestations, in the direction of languor as well as irritability—anaesthesia as well as hyperaesthesia—is of the first importance in the difficult task of managing convalescence from true neurasthenia. The "irritable weakness," includes the liability to quick exhaustion of the small increments of nervous energy that have been slowly gained, and therewith the speedy reduction of sensory, as well as motor power, to the degree of "bluntness," as Arndt has stated it. Pathological fatigue, or nervous exhaustion, being shown to be a condition in which there is direct and constant relation between physical disorder and mental symptoms, these should be noted, together with both the increase and the blunting of sensitiveness, in any comprehensive definition of the disease. It may therefore be defined as follows: *Neurasthenia is a morbid condition of the nervous system, and its underlying characteris-*

tics are excessive weakness, and irritability or languor, with mental depression and weakened attention.

This method of analysis into four orders of symptoms is applicable to all cases of neurasthenic disorder of the physiological activities involved, from the passing over of normal into pathological fatigue, in the simplest forms, to the gravest manifestations of emotional disturbances, disordered attention, and sensory and motor irritability and languor. The symptoms included in the first three orders are regarded as purely mental; those characterised in the fourth order, while referring to the well-marked development of changes in sensitiveness and activity of bodily functions, imply the necessary association with them of the mental symptoms before noted. These changes of bodily sense and activity may be detected, in the slighter degrees, in the earlier stages of neurasthenia. The value of the practical application of these discriminations in diagnosis may now be illustrated by describing some of the special ways in which certain symptoms must be interpreted. By this method of analysis we may readily estimate the significance of the symptoms of depression of feeling, of weakening of voluntary attention, and of worry. But there are certain more subtle effects of the mixed condition, usually found, of hyperaesthesia and anaesthesia.

One of the most striking special symptoms which the foregoing considerations point out and may serve to explain, is a paradoxical one, but one most commonly presented for clinical observation. The sensory function by which the complex normal feelings of fatigue are appreciated, may itself be over-exercised to exhaustion. There is *tire* of the power to *feel the tire.* This condition may be called *fatigue-anaesthesia*, and, beginning with the early stages of pathological fatigue, there is usually some degree of it. Every physician has experienced this when, after a night of anxious professional work, ,with loss of sleep, he has a day of excitable alertness of mind and body, and there is a sense of

nervous strain, with, perhaps, undue mental facility and physical irritability. Many hours sleep may be gained in the following night, but instead of feeling refreshed he has a sense of *malaise*, languor and fatigue. The real fatigue was greater the day before, but he could not feel it as such. It is not until the second day after the excessive effort that he has recovered his exhausted power to feel the fatigue. In a lesser degree this fatigue-anaesthesia becomes a constant accompaniment of the neurasthenic condition. Over-worked women, professional and business men, "work on their nerves," and say they "don't feel tired, and nothing is the matter." They "feel better" when actively exercised in their customary labors. This condition comes on insidiously and is a most dangerous one. The patient is neurasthenic before anybody suspects it. With the impairment of the natural fatigue-sense the mental effect is that he will not believe even his physician's diagnosis of "fatigue." He is, therefore, prone to look for some other reason for his sense of ill-being and inefficiency; and finds, in retrospection, cause for self-reproach and hopelessness in the future.

Fatigue-anaesthesia manifests itself in connection with another special symptom peculiar to conditions of "fatigue," that of "morning tire," sometimes called "morning misery." Extreme examples of this are seen in the victims of dissipation. In ordinary cases of pathological fatigue it is a persistent symptom; the patient is likely to awake in the early morning unrefreshed by a fair amount of sleep, and often in the depths of depression. The physical signs of exhaustion are then more manifest. These symptoms represent the truth as to his neurasthenic condition. After breakfast he feels better, and by the middle of the day the stimulation of the daily interests and press of business has apparently restored his good feeling. At the close of the day he is comfortable and cheerful, laughs at his morning fears, and is prone to over-do himself in recreation or evening work. That day's experience is regularly repeated.

Each night he rests enough to recover some of the feelings that attend upon "fatigue," but he often does not recognise it in the absence of the true fatigue-sense. A still further blunting of this sense is caused by the ill-timed stimulation of unwisely continued effort. Along with the restlessness of his "irritable weakness," there is a fictitious sense of well-being because of the temporary abolition of the sense of ill-being, as in mild intoxication by alcohol.

In the management of convalescence from neurasthenia, or of cases that would get well if they could be managed, there is nothing more discouraging than the succession of relapses that they undergo. Such patients, having been subjected to rest treatment, may be fat enough and maintain a fair degree of comfort when effort is kept within the limits of pathological fatigue. They complain of tire and various discomforts upon a little effort, which must be made in order to gain by physiological use the strength to make it. It seems a never-ending process; some patients cannot abide its slowness, and make effort too soon; others resist great persuasion to make enough. But some event may occur that excites desire or a sense of duty. The undue quickness of response to the stimulation of interest and attention is to be recognised as an evidence of irritable weakness. The apparent ease and unwonted zest of the effort is not a manifestation of real power; it means that there is a speedy blunting of the sense of fatigue. The reaction of exhaustion and mental misery that follows shows the real weakness and the need of unfailing patience and discretion. Most patients of this class have to be taught how to recognise the mental and physical signs of fatigue peculiar to themselves, other than the normal feeling of it. They must also be taught that some degree of fatigue thus manifested must be regularly incurred as wholesome tire. But both patient and physician must be guided alone by individual experience and judgment as to the amount of effort. Feeling is often a misleading guide for doing or *not doing.*

Many neurasthenic people are plied with recreation to "distract the attention," and go on journeys in search of health, when it is not stimulation, mental or physical, that is needed, but rest. The physician may save many a patient from such a final strain, that would precipitate a break-down, by recognising the fact that his apparent ability to do things without fatigue, when the mental signs of it are present, is the strongest indication that he has reached a dangerous degree of nervous exhaustion, marked so plainly by loss of the fatigue-sense. In such cases, after a course of rest treatment, which must often be more or less modified, exercise becomes most important, in the form of gentle bodily effort and mental stimulation by recreation in gradually increased amount. The guide to the limitation of exercise is to be found in its effects, such as the slight return of restlessness and insomnia at night, and the mental and bodily discomfort liable to appear on the following morning. Exercise may be pressed to the extent of not causing these effects; it promotes nutrition, and excretion of waste products, the free action of the skin, etc.

The physician will look to the therapeutics of tonics and nutrition, with careful attention to all the forms of elimination. But while he is doing this, the successful treatment of neurasthenia means the careful recognition of all its signs. The earliest indications for diagnosis, and the clearest for treatment—and often the only ones —are the mental symptoms. It is the conditions of fatigue that are to be treated, and the study of the working of the fatigue-sense affords the safest and surest guide, although its signs are so often negative. A correct and fine appreciation of what the mind can do enters into our commonest knowledge and experience, and we use the most familiar words to describe its operations. This paper has been written with the hope that it may be a help to the systematic observation of some of the commonest and most valuable of clinical indications, both for prevention and cure.

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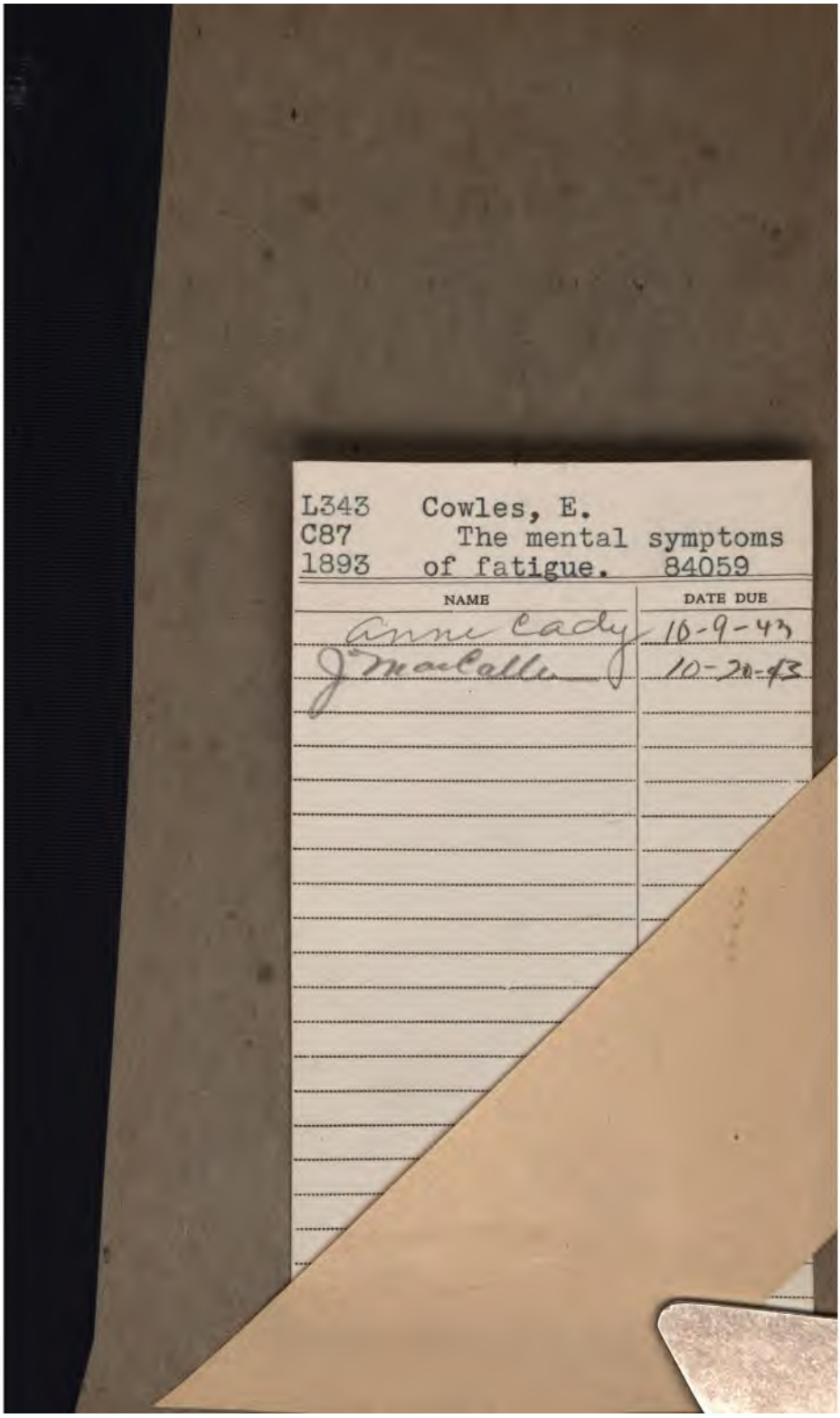

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